Claims

1. An isolated peptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ 1D NO: 3, SEQ 1D NO: 10 to SEQ 1D NO: 12, SEQ 1D NO: 77, SEQ 1D NO: 81, and SEQ 1D NO: 90, wherein the peptide is capable of inducing T cells cross-reacting with said peptide, wherein said peptide has an overall length of not more than 30 amino acids, and wherein the peptide is in the form of a pharmaceutically acceptable salt.

2. The peptide according to claim 1 having the ability to bind to a molecule of the human major histocompatibility complex (MHC) class-l or -II.

3. The peptide according to claim 1, wherein the peptide is modified and/or includes non-peptide bonds.

4. A fusion protein comprising 80 N-terminal amino acids of the HLA-DR antigen-associated invariant chain (Ii) as derived from GenBank Accession Number X00497, and a peptide having an overall length of not more than 30 amino acids, wherein said peptide comprises an amino acid sequence selected from the group consisting of SEQ 1D NO: 2, SEQ 1D NO: 3, SEQ 1D NO: 10 to SEQ 1D NO: 12, SEQ 1D NO: 77, SEQ 1D NO: 81, and SEQ 1D NO: 90, wherein the peptide is capable of inducing T cells cross-reacting with said peptide.

5. A peptide according to claim 1 for use in medicine.

6. A method of producing a peptide according to claim 1, the method comprising culturing a host cell comprising an expression vector encoding the peptide and isolating the peptide from the host cell or its culture medium.

7. An in vitro method for producing activated cytotoxic T lymphocytes (CTL), the method comprising contacting in vitro CTL with antigen loaded human class I or II MHC molecules expressed on the surface of a suitable antigen-presenting cell for a period of time sufficient to activate said CTL in an antigen specific manner, wherein said antigen is a peptide according to claim 1.

8. The method according to claim 7, wherein the antigen is loaded onto class 1 or II MHC molecules expressed on the surface of a suitable antigen-presenting cell by contacting a sufficient amount of the antigen with an antigen-presenting cell.

9. The method according to claim 7, wherein the antigen-presenting cell comprises an expression vector capable of expressing said peptide.

10. Activated cytotoxic T lymphocytes (CTL), produced by the method according to claim 7, which selectively recognise a cell which aberrantly expresses a polypeptide comprising an amino acid sequence selected from the group consisting of SEQ 1D NO: 2, SEQ 1D NO: 3, SEQ 1D NO: 10 to SEQ 1D NO: 12, SEQ 1D NO: 77, SEQ 1D NO: 81, and SEQ 1D NO: 90.

11. A method of killing target cells in a patient which target cells aberrantly express a polypeptide comprising an amino acid sequence selected from the group consisting of SEQ 1D NO: 2, SEQ 1D NO: 3, SEQ 1D NO: 10 to SEQ 1D NO: 12, SEQ 1D NO: 77, SEQ 1D NO: 81, and SEQ 1D NO: 90, the method comprising administering to the patient an effective number of cytotoxic T lymphocytes (CTL) as defined in claim 7.

12. A pharmaceutical composition comprising an entity selected from the group consisting of:
a) a peptide according to claim 1 and a pharmaceutically acceptable carrier.

13. The pharmaceutical composition according to claim 12, wherein the pharmaceutical composition induces an immune response.

14. The pharmaceutical composition according to claim 12, wherein the immune response is directed against an antigen over- or aberrantly expressed by a cancer cell.

15. The pharmaceutical composition according to claim 14, wherein said cancer cells are gastric cancer cells, gastrointestinal cancer cells, colorectal cancer cells, pancreatic cancer cells, lung cancer cells or renal cancer cells.

16. The peptide of claim 1 having an overall length of not more than 14 amino acids.

17. The peptide of claim 1, wherein the amino acid sequence consists of SEQ 1D NO: 2, SEQ 1D NO: 3, SEQ 1D NO: 10 to SEQ 1D NO: 12, SEQ 1D NO: 77, SEQ 1D NO: 81, or SEQ 1D NO: 90.

18. The peptide of claim 1 having an overall length of not more than 12 amino acids.

19. The pharmaceutical composition according to claim 12, wherein the pharmaceutical composition includes one or more adjuvants.

20. The pharmaceutical composition according to claim 19, wherein the one or more adjuvants is selected from the group consisting of imiquimod, resiquimod, GM-CSF, cyclophosphamide, sunitinib, bevacizumab, interferon-alpha, CpG oligonucleotides and derivates, poly-(I:C) and derivates, RNA, sildenafil, and particulate formations with PLG or virosomes.

21. The pharmaceutical composition according to claim 19, wherein the one or more adjuvants is selected from the group consisting of a colony-stimulating factor, imiquimod, resiquimod, and interferon-alpha.

22. The pharmaceutical composition according to claim 19, wherein the one or more adjuvants comprises imiquimod or resiquimod.

23. The pharmaceutical composition according to claim 12, wherein the pharmaceutical composition comprises the peptide either in the free form or in the form of a pharmaceutically acceptable salt.

24. The pharmaceutical composition according to claim 23, wherein the pharmaceutical composition comprises the peptide as a salt of acetic acid or hydrochloric acid.

CLAIMS

1. An isolated peptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO: 2 SEQ ID NO: 3, SEQ ID NO: 10 to SEQ ID NO: 12, SEQ ID NO: 77, SEQ ID NO: 81, and SEQ ID NO: 90, wherein the peptide is capable of inducing T cells cross-reacting with said peptide, wherein said peptide has an overall length of not more than 30 amino acids, and wherein the peptide is in the form of a pharmaceutically acceptable salt.

2. The peptide according to claim 1 having the ability to bind to a molecule of the human major histocompatibility complex (MHC) class-I or -II.

3. The peptide according to claim 1, wherein the peptide is modified and/or includes non-peptide bonds.

4. A fusion protein comprising 80 N-terminal amino acids of the HLA-DR antigen-associated invariant chain (Ii) as derived from GenBank Accession Number X00497, and a peptide having an overall length of not more than 30 amino acids, wherein said peptide comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 10 to SEQ ID NO: 12, SEQ ID NO: 77, SEQ ID NO: 81, and SEQ ID NO: 90, wherein the peptide is capable of inducing T cells cross-reacting with said peptide.

5. A peptide according to claim 1 for use in medicine.

6. A method of producing a peptide according to claim 1, the method comprising culturing a host cell comprising expression vector encoding the peptide and isolating the peptide from the host cell or its culture medium.

7. An in vitro method for producing activated cytotoxic T lymphocytes (CTL), the method comprising contacting in vitro CTL with antigen loaded human class I or II MHC molecules expressed on the surface of a suitable antigen-presenting cell for a period of time sufficient to activate said CTL in an antigen specific manner, wherein said antigen is a peptide according to claim 1.

8. The method according to claim 7, wherein the antigen is loaded onto class I or II MHC molecules expressed on the surface of a suitable antigen-presenting cell by contacting a sufficient amount of the antigen with an antigen-presenting cell.

9. The method according to claim 7, wherein the antigen-presenting cell comprises an expression vector capable of expressing said peptide.

10. Activated cytotoxic T lymphocytes (CTL), produced by the method according to claim 7, which selectively recognise a cell which aberrantly expresses a polypeptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO:2,SEQ ID NO: 3, SEQ ID NO: 10 to SEQ ID NO: 12, SEQ ID NO: 77, SEQ ID NO: 81, and SEQ ID NO: 90.

11. A method of killing target cells in a patient which target cells aberrantly express a polypeptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 10 to SEQ ID NO: 12, SEQ ID NO: 77, SEQ ID NO: 81, and SEQ ID NO: 90, the method comprising administering to the patient an effective number of cytotoxic T lymphocytes (CTL) as defined in claim 7.

12. A pharmaceutical composition comprising
a peptide according to claim 1 and a pharmaceutically acceptable carrier.

13. The pharmaceutical composition according to claim 12, wherein the pharmaceutical composition induces an immune response.

14. The pharmaceutical composition according to claim 12, wherein the immune response is directed against an antigen over- or aberrantly expressed by a cancer cell.

15. The pharmaceutical composition according to claim 14, wherein said cancer cells are gastric cancer cells, gastrointestinal cancer cells, colorectal cancer cells, pancreatic cancer cells, lung cancer cells or renal cancer cells.

16. The peptide of claim 1 having an overall length of not more than 14 amino acids.

17. The peptide of claim 1, wherein the amino acid sequence consists of SEQ ID NO:2,SEQ ID NO: 3, SEQ ID NO: 10 to SEQ ID NO: 12, SEQ ID NO: 77, SEQ ID NO: 81, or SEQ ID NO: 90.

18. The peptide of claim 1 having an overall length of not more than 12 amino acids.

19. The pharmaceutical composition according to claim 12, wherein the pharmaceutical composition includes one or more adjuvants.

20. The pharmaceutical composition according to claim 19, wherein the one or more adjuvants is selected from the group consisting of imiquimod, resiquimod, GM-CSF, cyclophosphamide, sunitinib, bevacizumab, interferon-alpha, CpG oligonucleotides and derivates, poly-(I:C) and derivates, RNA, sildenafil, and particulate formations with PLG or virosomes.

21. The pharmaceutical composition according to claim 19, wherein the one or more adjuvants is selected from the group consisting of a colony-stimulating factor, imiquimod, resiquimod, and interferon-alpha.

22. The pharmaceutical composition according to claim 19, wherein the one or more adjuvants comprises imiquimod or resiquimod.

23. The pharmaceutical composition according to claim 12, wherein the pharmaceutical composition comprises the peptide as a salt of acetic acid or hydrochloric acid.